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STYLUS HEAD FOR RECORDING AND REPRODUCING SOUND RECORDS

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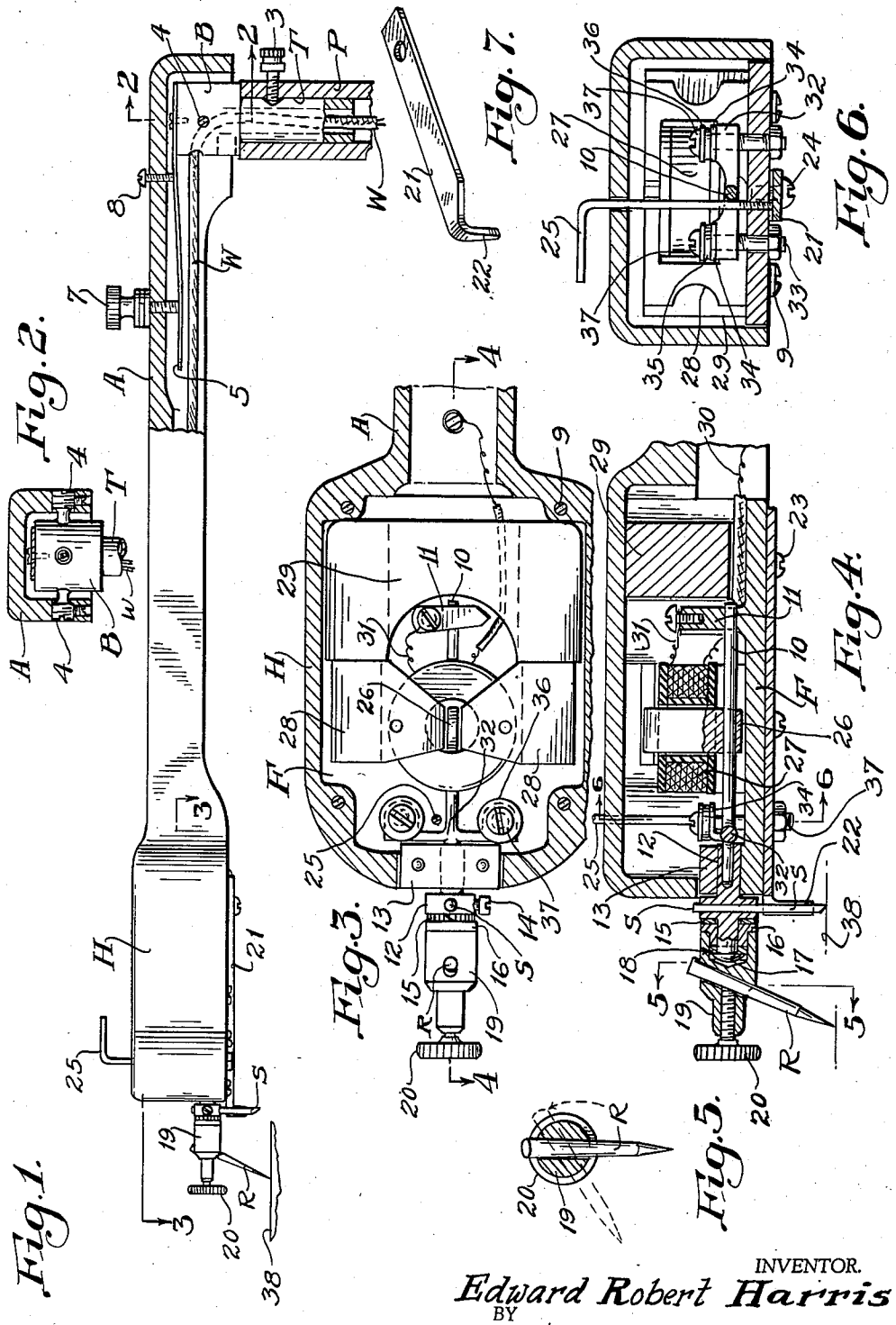


Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

Fig. 7.

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STYLUS HEAD FOR RECORDING AND REPRODUCING SOUND RECORDS

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3 Claims. (Cl. 179—100.41)

My invention relates to mechanisms used in stylus heads for recording and reproducing sound records.

This mechanism is adapted to be applied and be used with any phonographic mechanism wherein what is known as scratch or sound groove mechanisms are involved, either lateral or hill and dale records are employed.

An object of my invention is to produce a head having special mechanisms which adapt the head to be used with high efficiency in any apparatus in use of those types of records.

Another object of my invention is to provide special mechanisms whereby two types of stylus points or needles may be used alternately, one for cutting a record and the other for reproducing the sound from a record, and each of these stylus points mounted to be actuated in relation to the one electromagnetic coil involved with what is known as amplifying electrical mechanisms.

Another object of my invention is to provide special details of construction and arrangement of the parts for simplicity and low cost of production.

Another object of my invention is to provide mechanisms which increase the efficiency of the performance of recording and reproducing of sound wherein a sound groove in a record is used.

Reference will be had to the accompanying drawing in which Fig. 1 is a longitudinal side elevation of the stylus head. Fig. 2 is a detail elevation on line 2—2 of Fig. 1. Fig. 3 is a plan on line 3—3 of Fig. 1 showing the mechanisms on the inside of the housing of the stylus head. Fig. 4 is a vertical section on line 4—4 of Fig. 3. Fig. 5 is a vertical section of a detail on line 5—5 of Fig. 4. Fig. 6 is a transverse vertical section on line 6—6 of Fig. 4. Fig. 7 is a perspective view of a depth gage for limiting the depth of a stylus point into a sound groove.

In the drawing P indicates a post or a suitable part of a phonograph machine to which a stylus head arm is supported in service position in the machine. W indicates the electrical conductor wires connecting the stylus head mechanisms to any suitable electrical amplifying means. These wires enter through the post P and are trained up through and out of one side of a block B and into and along the under side of a stylus arm A to the stylus carrying means. The block B is provided with a tubular extension T mounted into the supporting post P and adapted to revolve around in said post P and be retained in a fixed position as desired by a set screw 3 in the post P whereby the tube T with its block B may be clamped in fixed position as desired.

The arm A is supported in hinged relation with the block B by trunnion pins 4, see Fig. 2, whereby the arm A may be rocked up and down on the pins 4. The arm A is supported upwardly in substantially a horizontal position by a spring 5 which is fixed into the block B by a screw 6, see Fig. 1. An adjustable contact of the arm A with the spring 5 is obtained by the set screws 7 and 8 whereby the gravity load of the outer portion of the arm A rests on the spring 5. The spring is adjusted to act as a counter balancing feature of the weight of the stylus head mechanisms.

The arm A is provided with a housing head H enclosing the stylus supporting mechanisms. This head H is provided with a bottom or frame block member F which carries the stylus mechanisms. This block F is fastened to the housing H by screws 9.

The stylus mechanisms are mounted on the frame block member F and can be all assembled thereon and then this block placed into the housing H.

The mechanisms are provided with a primary recording stylus S and a secondary reproducing stylus R both of which are mounted to be carried by a stylus carrying shaft or body 10 and to contact in turn a record body 38.

The shaft 10 is supported at its inner end in a bearing 11 in the block F. The front end of shaft 10 is fixed into a block 12 which thus amounts to an extension of shaft 10. The block 12 is carried in a bearing 13 in the frame block F. The block 12 carries the stylus point or pin S and the latter is held therein by a set screw 14.

On block 12 there is mounted a friction collar 15 against which there is pressed a flanged ring 16 thereby producing sufficient friction to cause this ring 16 to vibrate with shaft 10 and block 12 but not to prevent the ring 16 from being adjusted by hand around the block 12.

The front end of block 12 is swaged over slightly at 17 against a small collar 18, see Fig. 4, which collar holds the ring 16 against the friction collar 15.

On flanged ring 16 and on the small collar 18 there is held by frictional contact a cylindrical block 19 in which the reproducing stylus pin or point R is fixed by a set screw 20. By this construction the stylus pin R may be revolved from the operating service position to out of service position, as shown by the dotted lines in Fig. 5.

The recording stylus S is adjusted to cut the

desired depth in a record groove or be held in the correct depth of such a groove by a depth gage 21. This gage has a contact finger 22 which rides on the record body 38 when desired to limit the depth of stylus S.

The finger 22 supports the weight of the stylus housing H of the arm A which is not sustained by the counter balance action of the spring 5 before described.

The gage 21 is supported by being fixed at its end by a screw 23 to the frame block F and is held from transverse movement by the screw 24 which latter screw is not necessarily clamped tightly to the block F. The finger 22 is adjusted to and from the depth relation of it to the stylus S by a rod 25 screwed through the block F and contacting the gage 21 and by this means the finger 22 is adjusted to control the depth of the stylus point S in relation to the record 38.

In cutting a new record and also in reproducing a sound from a record the slight and very small variations in the surface of the record body are serious factors as modifying the character of the sound developed from the record. The finger 22 is as closely as commercially possible as to associate its position to that of the stylus S whereby the finger 22 will cause the stylus to conform as nearly as possible to the depths produced by the exciting vibrations of the stylus of the sound which actuates the stylus or the sound which is produced through the medium of the stylus. This arrangement of the parts improves the quality of the service of this type of mechanism.

The amplitude of vibrations of the stylus point is dampened and shortened in both directions by means of a yoke 32 which is fixed to stylus shaft 10 and mounted on two screw studs 33 which are fixed in the frame block F. The yoke 32 is provided with two horizontal flanges 34 through which the studs 33 pass. On these flanges 34 there are mounted small discs of rubber 35 which take the place of or act like springs and these discs 35 are clamped on the studs 33 by metal washers 36 clamped by the screws 37 of the studs 33.

The amount of amplitude of the vibrations of the armature 26 is slight and the rubber spring washers act in a rebounding function at either end of the amplitude of the armature 26 and this rebounding function assists in overcoming inertia of the weight of the moving parts and thereby aids in sensitivity of the service rendered by this mechanism.

The length of a rotatable stylus R is always longer than the stylus S and therefor when the stylus R contacts the record body thereby the whole stylus head is raised which thereby frees the stylus S from contacting the record. The stylus R may be frictionally adjusted for a considerable varying angle as relates to the direct vertical line to the record body, as shown by full lines in Fig. 5, and still function normally as a reproducing stylus, when in an angle less than the dotted line angle of Fig. 5.

To be able to make a slightly angular adjustment of the recording stylus R is particularly desirable when variable speed flat records are used. When I say variable speed for the record body this is produced in form to cause a constant speed of the stylus in the record body. The constant speed of the stylus on the sound track has such merits over the variable speed of the old style records that the constant speed sound track records are coming rapidly into general use, particularly as relates to the higher quality of the sound results in phonograph machines.

Much amateur recording is engaged in in which frequently the cutting stylus becomes dull or the blank may be of a hard character. These things tend to slow down the cutting of the groove. When afterwards this sound track so cut is reproduced, the variation in speed often changes the pitch of the sound to become a serious injury.

In the constant speed sound track machines which means a variable speed for the disc itself, my playback rotatable stylus R may be revolved at an angle ahead or back slightly as relates to what was the recording speed when that record was cut and this changing of time of travel by the revolving of my rotatable stylus R is used to correct the pitch adjustment of the sound produced.

On the constant sound track speed record the swinging of my reproducing stylus R one quarter of an inch will change the pitch from tenor to bass and if so desired make up the difference between fifty and sixty cycles A. C. current. This permits adjustments as relates to the character of currents used in cutting as differentiated from reproducing any given sound track.

What I claim is:

1. In a mechanism of the class described, a stylus head, a stylus carrying shaft suitably mounted in said head, and an armature mounted on said stylus carrying shaft, an electrical exciting coil in association with said armature for exciting and being excited by the vibrations of the said armature on said stylus shaft, a stylus carrying block fixed on said stylus shaft, a fixed stylus point fixed into the said block, a cylindrical block mounted on the said stylus carrying block and rotatable thereon and held in place by frictional contact, a stylus point mounted in this cylindrical block and adapted to be rotated with the said cylindrical block, this rotatable stylus point longer in length than the said fixed stylus point, a flat record carrying body located beneath the said stylus head and adapted to be contacted alternately by the said fixed stylus and the said rotatable stylus carried in its block, the latter stylus being longer than the said fixed stylus as aforementioned to prevent the contact simultaneously of both stylus points with the record, the said rotatable stylus being rotated out of contact with the said record when the fixed stylus is to contact the record body.

2. A stylus carrying head mounted over a flat record carrying body, a stylus carrying shaft suitably mounted in said head in form to rotatably vibrate, an armature mounted on said stylus carrying shaft, an electrical magnetic field mounted to be excited by the vibrations of said armature and also vibrate the said armature, two stylus points mounted on the said stylus shaft one of them being shorter than the other, the short one fixed to the said stylus shaft and the longer one rotatably mounted on said stylus shaft, and when this rotatable stylus is revolved to contact the record body, this results in lifting the shorter stylus up free of contact with the said record body.

3. In a sound recording and reproducing head, a stylus carrying shaft mounted in said head and adapted to be rotatably vibrated, an armature mounted on said stylus carrying shaft, an electrical magnetic field adapted to be excited

by or excite the said armature on said shaft, a flat record body mounted beneath the said stylus head, a stylus point fixed in the said stylus carrying shaft and mounted to cut a record groove in the said record body, a rotatable stylus mounted in a rotatable block adapted to be revolved on the said stylus shaft, the said rotatable block fixed to the said rotatable shaft by frictional means whereby any desired position may be adjusted as relates to the contact of the said rotatable stylus to the said record body, this rotatable stylus point being longer than the said fixed stylus, the said fixed stylus being mounted in vertical relationship to the said record body and the said rotatable stylus on account of its frictional rotatable adjustment adapted to be adjusted to contact the record body in an angular directional position transverse to the sound track for the purpose of playback adjustment, this permitting the rotatable stylus to contact exactly the sound track cut by the said fixed stylus when a slight movement of the record body has intervened between the alternate contacts of said stylus points.

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